SECTION 15325 - FIRE PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 SUMMARY

A. This Section specifies automatic sprinkler systems for buildings and structures. Also, the contractor shall review the existing layout in the remodel area of project and reposition existing sprinkller heads for proper sprinkler coverage. Materials and equipment specified in this Section include:
   1. Pipe, fittings, valves, and specialties.
   2. Sprinklers, spare sprinkler head cabinet, and accessories.

B. Products furnished and installed include sprinkler head cabinet with spare sprinkler heads.

C. This is a "performance" specification. Approved design work is required of the contractor as part of this work. Contractor shall include repositioning of existing sprinkler heads in remodeled areas.

1.3 DEFINITIONS

A. Pipe sizes used in this Specification are Nominal Pipe Size (NPS).

B. NFPA is the National Fire Protection Association. Referenced standards are the latest edition.

C. Other definitions for fire protection systems are listed in NFPA Standard 13 and NFPA 96.

D. Working Plans as used in this Section means those documents (including drawings and calculations) prepared pursuant to the requirements contained in NFPA 13 for obtaining approval of the authority having jurisdiction.

E. For the purpose of this specification, a "sprinkled building" means that all areas are sprinkled according to the provisions of NFPA 13.

1.4 SYSTEM DESCRIPTION

A. All new building areas, including concealed plenum areas, attic, etc., to be sprinklered in accordance with light hazard as verified by NFPA 13 latest edition. Room Number 0402 shall be sprinklered in accordance with ordinary hazard group 1. All piping shall be concealed behind or above room finishes except as noted otherwise on these drawings. The sprinkler system will be designed in accordance with NFPA 13 hazard requirements.

B. Fire protection system is a "wet-pipe" system employing automatic sprinklers attached to a piping system containing water and connected to the existing water supply so that water discharges immediately from sprinklers opened by fire.
   1. Installation of fire sprinkler mains to new areas shown where required to create a "sprinkled" building.
   2. Installation of fire sprinkler heads and branch piping where required to create a "sprinkled" building.

a. Only the attic may have exposed piping and rough bronze sprinkler heads.
b. All other areas, including any vaulted ceilings, shall have concealed piping and semi-recessed polished chrome sprinkler heads with chrome plated escutcheons.
c. Sprinkler piping shall be routed through heated, non-freezing areas, so piping will not freeze and anti-freeze and dry pipe systems will not be required.
d. The two entrance canopies and new ambulance garage shall be provided with anti-freeze in the piping systems and anti-freeze loops in accordance with NFPA 3.5.3.

3. In preparation of the "working plans", the most efficient piping and head layout may be used except in the following areas.
   a. All corridors. Heads shall be installed along the centerline of the corridor and in the exact center of the ceiling tiles.
   b. In all cases, comply with the requirements of paragraphs 1.6 and 1.7 of this specification.

1.5 SUBMITTALS

A. Product Data for each type sprinkler head, valve, piping specialty, fire protection specialty, cabinet, and fire department connection.

B. Shop Drawings prepared in accordance with NFPA 13 identified as "Working Plans," including hydraulic calculations. Acceptance of the shop drawings shall be contingent upon approval by the authority having jurisdiction. Using the requirements of NFPA 13 Sections 6-1 through 6-4, where applicable as a check requirements of NFPA 13 Sections 6-1 through 6-4, where

applicable as a check list, submit complete Working Plans, Hydraulic Calculation Forms and Water Supply Information in a clear and legible format. Incomplete or unclear submittals will be rejected.

C. Maintenance Data for each type sprinkler head, valve, piping specialty, and fire protection specialty, specified, for inclusion in operating and maintenance manual specified in Division 1 and Division - 15 Section "Basic Mechanical Requirements."

D. Welders' qualification certificates.

E. Test Reports and Certificates include "Contractor's Material & Test Certificate for Aboveground Piping" as described in NFPA 13.

F. Designer Qualification: Provide written certification that designer is NICET level III Certified.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installation and alterations of fire protection piping, equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified means experienced in such work (experienced shall mean having a minimum of 5 previous projects similar in size and scope to this project), familiar with all precautions required, and has complied with all the requirements of the authority having jurisdiction. Upon request, submit evidence of such qualifications. Refer to Division-1 Section: "Definitions and Standards" for definitions for "Installers."

B. Qualifications for Welding Processes and Operators: Comply with the requirements of AWS D10.9, Specifications for Qualifications of Welding Procedures and Welders for Piping and Tubing, Level AR-3."

C. Regulatory Requirements: Comply with the requirements of the following codes:

1. NFPA 13 - Light hazard and ordinary hazard group 1 - Standard for the Design and Installation of Sprinkler Systems, latest edition.
2. Polybutylene pipe is not allowed, regardless of its listing.
3. Working plans as identified in para. 6-1 shall also include:

    a. Pipe elevations adequate to determine slope (including no slope).
    b. Location of inspector test.
    c. Location of water flow alarm and its time delay, if any.

4. Hydraulic Calculation Forms as identified in para. 6-2 shall also include:
    a. Separate calculations for each occupancy class.
    b. Separate calculations where needed to identify the hydraulically most demanding area. The Contracting officer shall be the judge of whether the hydraulically most demanding area is sufficiently identified.
    c. Water supply information, Para. 6-3, shall be based on flow test performed within 6 months prior to preparation of the hydraulic calculation forms.

5. Water Supply Information as identified in Para. 6.4 shall be attached to the graph sheet.

6. <u>Existing Conditions:</u>
    a. For connections and systems involving existing system risers, this Contractor shall verify that the existing system riser is configured and functioning properly according to NFPA-13. State that such is

true on the General Notes, Sheet 1 of the Working Plans.

7. Comply with the protection area limitations listed in para. 4-2 for each sprinkler riser.

8. UL and FM Compliance: Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled, and Factory Mutual approved for the application anticipated.

9. NFPA 1963, latest edition - Screw threads and gaskets for fire connections.

1.7 SEQUENCING AND SCHEDULING

A. Schedule rough-in installations with installations of other building components.

B. Piping layout shall not interfere with other engineered building components such as structure, mechanical ductwork, sloped SWV piping, lighting, and electrical panels, feeders, etc.

C. Maintain 12 inches (305 mm) clearance between removable ceiling tiles and horizontal sprinkler piping. Where structure, HVAC, electrical, or plumbing systems interfere with this location, adjust sprinkler piping upwards, if possible.

1.8 EXTRA MATERIALS

A. Sprinkler Heads and Cabinets: Furnish six extra sprinkler heads of each style included in the project. Furnish each style with its own sprinkler head cabinet and special wrenches as specified in this Section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide fire protection system products from one of the following or approved equal:

1. Gate Valves:
   a. Fairbanks
   b. Jenkins
   c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
   d. Stockham
   e. Milwaukee

2. Butterfly Valves:
   a. Central Sprinkler Corp.

3. Swing Check Valves:
   a. Fairbanks
   b. Jenkins
   c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
   d. Star Spinkler Corp.
   e. Stockham
   f. Milwaukee

4. Grooved Mechanical Couplings:
   a. Gustin-Bacon
   b. Stockham
   c. Victaulic

5. Water Flow Switch:
   a. Potter
   b. Simplex

6. Sprinkler Heads:

a. Automatic Sprinkler Corp of America.
b. Central Sprinkler Corp.
c. Firematic Sprinkler Devices, Inc.
d. Globe Fire Equipment Co.
e. Guardian Automatic Sprinkler Co., Inc.
f. ITT Grinnell
g. Reliable Automatic Sprinkler Co., Inc.
h. Star Sprinkler Corp.
i. Viking Corp.

7. Water Flow Indicators:
a. Reliable Automatic Sprinkler Co., Inc.
b. Star Sprinkler Corp.
c. Victaulic Company of America.
d. Viking Corp.

2.2 PIPE AND TUBING MATERIALS

A. General: Pipe and tube used in fire sprinkler systems shall meet or exceed Section 2-3 of NFPA - 13.

B. All piping shall be rated for use in an air plenum according to the Uniform Mechanical Code, latest edition.

C. Fire wall penetration for pipes shall meet the requirements of the Uniform Building Code, latest edition. The pipe penetration through the fire rated wall shall meet the UL rating of the wall. Refer to Division 7 for special sealers and material.

2.3 PIPE FITTINGS

A. Pipe Fittings shall meet or exceed Section 2-4 of NFPA - 13.

2.4 JOINING MATERIALS

A. Welding Materials: Comply, with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
   1. Brazing Filler Metals: AWS A5.8, Classification BCuP series.
   2. Solder Filler Metals: ASTM B32, 95-5 Tin-Antimony.

B. Gasket Materials: thickness, material, and type suitable for fluid or gas to be handled, and design temperatures and pressures.

2.5 GENERAL DUTY VALVES

A. Gate Valves - 2 inches (50 mm) and Smaller: body and bonnet of cast bronze, 175 psi. (1210 kPa) cold water working pressure - non-shock, threaded ends, solid wedge, outside screw and yoke, rising stem, screw-in bonnet, and malleable iron handwheel. Valves shall be capable of being repacked under pressure, with valve wide open.

B. Gate Valves - 2 1/2 inches (65 mm) and Larger: iron body; bronze mounted, 175 psi. (1210 kPa) cold water working pressure - non-shock. Valves shall have solid taper wedge; outside screw and yoke, rising stem; flanged bonnet, with body and bonnet conforming to ASTM A 126 Class B; replaceable bronze wedge facing rings; flanged ends; and a packing assembly consisting of a cast iron gland flange, brass gland, packing, bonnet, and bronze bonnet bushing. Valves shall be capable of being repacked under pressure, with valve wide open.

C. Swing Check Valves: MSS SP-71; Class 175, cast iron body and bolted cap conforming to ASTM A 126, Class B; horizontal swing, with a bronze disc or cast iron disc with bronze disc ring, and flanged ends. Valve shall be capable of being refitted while the valve remains in the line.

2.6 AUTOMATIC SPRINKLERS

A. Sprinkler Heads: fusible link type, and style as indicated or required by the application. Unless otherwise indicated, provide heads with nominal 15 mm discharge orifice, for "Ordinary" temperature range.
   1. Where ordinary temp. range is inappropriate, provide higher temp. heads.

B. Sprinkler Head Finishes: Provide heads with the following finishes:
   1. Upright, Pendent, and Sidewall Styles: chrome plated in finish spaces, exposed to view; rough bronze finish for heads in unfinished spaces and not exposed to view.
   2. Recessed Style: bright chrome, with bright chrome escutcheon plate.

C. Sprinkler Head Cabinet and Wrench: finished steel cabinet, suitable for wall mounting, with hinged cover and space for 6 spare sprinkler heads plus sprinkler head wrench. Provide a separate cabinet for each style sprinkler head on the project.

2.7 ALARM DEVICES

A. General: Types and sizes shall mate and match piping and equipment connections.

B. Water Flow Indicators: vane type water flow detector, rated to 250 psi. (1725 kPa); designed for horizontal or vertical installation; have 2-SPDT circuit switches to provide isolated alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 Volts DC; complete with factory-set, field-adjustable retard element to prevent false signals, and tamper-proof cover which sends a signal when cover is removed.

C. Supervisory Switches SPST, normally closed contracts, designed to signal valve in other than full open position.

2.8 FIRE SPRINKLER RISER NAMEPLATE

A. Each fire sprinkler riser shall have permanently affixed a nameplate for identification.

B. The nameplate shall be 1.6 mm thick sheet metal or heavier, no less than 150 mm X 150 mm.

C. The nameplate shall be painted red and white with gloss enamel.

D. Information of the name plate shall be in accordance with NFPA 13 para. 8.5.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine field conditions thoroughly for suitability.

B. Notify the Owner of unsuitable conditions.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PIPING INSTALLATIONS

A. Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of piping systems. So far as practical, install piping as indicated.

B. Install sprinkler piping to provide for system drainage in accordance with NFPA 13.

C. Use approved fittings to make all changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions in pipes 2 inches (50 mm) and smaller, adjacent to each valve. Unions are not required on flanged devices or in piping installations using grooved mechanical couplings.

E. Revise and modify existing piping header at building entrance to accommodate new risers.

F. Hangers and Supports: Comply with the requirements of NFPA 13. Hanger and support spacing and locations for piping joined with grooved mechanical couplings shall be in accordance with the grooved mechanical coupling manufacturer's written instructions, for rigid systems. Provide protection form damage where subject to earthquake in accordance with NFPA 13.

G. Install test connections sized and located in accordance with NFPA 13 complete with shutoff valve. Test connections may also serve as drain pipes.

H. Install pressure gage on the riser or feed main at or near each test connection. Provide gage with a connection not less than 1/4 inch (6 mm) and having a soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and where they will not be subject to freezing.

3.3 PIPE JOINT CONSTRUCTION

A. Welded Joints: AWS D10.0, Level AR-3.

B. Threaded Joints: conform to ANSI B1.20.1, tapered pipe threads for field cut threads. Join pipe, fittings, and valves as follows:
   1. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
   2. Align threads at point of assembly.
   3. Apply appropriate tape or thread compound to the external pipe threads.
   4. Assemble joint to appropriate thread depth. When using a wrench on valves place the wrench on the valve end into which the pipe is being threaded.

   5. Damaged Threads: Do not use pipe with threads which are corroded, or damaged. If a weld opens during cutting or threading operations, that portion of pipe shall not be used.

C. Mechanical Grooved Joints: cut or roll grooves on pipe ends dimensionally compatible with the couplings.

D. End Treatment: after cutting pipe lengths, remove burrs and fins from pipe ends.

E. Solder Joints: Comply with procedures contained in the Copper Development Association, "Handbook for Fire Sprinkler Systems".

F. Brazed Joints: Comply with the procedures contained in the AWS "Brazing Manual".

3.4 VALVE INSTALLATIONS

A. General: Install fire protection specialty valves, fittings, and specialties in accordance with the manufacturer's written instructions, NFPA 13 and the authority having jurisdiction.

B. Provide a complete set of Record Drawings showing the actual piping and head layout, sizes, etc. Highlight all points of manual operation including but not limited to drains, shut-off valves, and alarms. In the case that major deviations from the Working Plans submitted at the project onset occur, provide revised Hydraulic Calculations as described earlier in this specification.

3.5 SPRINKLER HEAD INSTALLATIONS

A. Use proper tools to prevent damage during installations.

3.6 FIELD QUALITY CONTROL

A. Flush, test, and inspect sprinkler piping systems in accordance with NFPA 13.

B. Replace piping system components, which do not pass the test procedures specified, and retest repaired portion of the system.

C. Maintain drawings on the job site updated daily for modifications. Use these drawings to prepare record drawings at project close out.

3.7 PROJECT CLOSEOUT

A. Provide a qualified representative to be present for all flow and other functional tests performed by the authority having jurisdiction. Assist in such tests, at least to the extent of identifying all valves and controls, and demonstrate their use if requested.

B. Provide a complete set of Record Drawings showing the actual piping and head layout, sizes, etc. Highlight all points of manual operation including but not limited to drains, shut-off valves, and alarms. In the case that major deviations from the Working plans submitted at the project onset occur, provide revised Hydraulic Calculations as described earlier in this specification. The Owner shall be the judge of whether deviations are major.

C. Provide a qualified representative to instruct the operating personnel in use and maintenance of the system. Allow for two hours of instruction. Use the Record Drawings and Maintenance Manual to show the Record Drawings and Maintenance Manual to show the Owner the location and proper use of manual operation.

END OF SECTION 15325